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	PIIN/SIIN DAAE07-00-C-L036	MOD/AMD P00005	
Name of Offeror or Contractor: SOUTHWEST RESEARCH INSTITUTE			

SECTION A - SUPPLEMENTAL INFORMATION

1. The purpose of bilateral modification P00005 is to:

- a. Extend the period of performance on Work Directive 001 from 10 Feb 2001 to 11 Aug 2001 at no additional cost to the Government. This work directive is funded by CLIN 0001AA and 0003AA. Revision 2 to Work Directive 001 reflecting the revised completion date is attached to this modification.
- b. Amend paragraph C.4.2 of the contract from "Analyze fuel consumption, oil consumption, air and oil filtration systems performance..." to "Analyze fuel consumption, oil consumption, air, fuel, and oil filtration systems performance..." The word "fuel" was inadvertently left out of this paragraph when the contract was awarded.

The following pages are changed:

Page	Description
2	Revise performance completion date for CLIN 0001AA
3	Revise performance completion date for CLIN 0003AA
6	Amend paragraph C.4.2

2. All other terms and conditions remain unchanged.

3. The total amount of the contract remains unchanged at \$2,272,074.

*** END OF NARRATIVE A 004 ***

Name of Offeror or Contractor: SOUTHWEST RESEARCH INSTITUTE

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0001AA	SECTION B - SUPPLIES OR SERVICES AND PRICES/COSTS <u>SERVICES LINE ITEM</u> NOUN: NEW SURGE CONTRACT SECURITY CLASS: Unclassified PRON: E102C132EH PRON AMD: 07 ACRN: AA AMS CD: 633005 DD <u>Inspection and Acceptance</u> INSPECTION: Destination ACCEPTANCE: Destination <u>Deliveries or Performance</u> DLVR SCH PERF COMPL <u>REL CD</u> <u>QUANTITY</u> <u>DATE</u> 001 0 11-AUG-2001 \$ 36,765.00				\$ 36,765.00

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ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT

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SECTION C - DESCRIPTION/SPECIFICATIONS/WORK STATEMENT

Statement of Work

For

Propulsion Systems Engineering Support

C.1 Scope

The Contractor shall provide the level of support, as required in Section B, to accomplish engineering and technical support services. This support encompasses propulsion engineering (C.3), analysis (C.4.), testing (C.5), evaluation (C.6), recommendations (C.7), and contract management (C.8). The Contractor shall perform all work under this surge contract in accordance with (IAW) discrete work directives issued by the Contracting Officer. All work directives will be issued by formal contract modification and signed by the Contracting Officer. The support provided by the Contractor shall augment existing resources with experience and capability, which is not normally available or is beyond in-house capabilities. All work is in assistance to the Propulsion Products Support Team and is advisory only. Any products delivered and services performed must be reviewed and approved by the Government before release. The Contractor shall not act or represent itself as an agent of the Government nor shall it have authority to make decisions or bind the Government to any agreements or commitments through performance of any work under this contract. The objective of this contract is to provide information and products to TARDEC's Propulsion Products Support Team and support offices for timely and cost effective management of propulsion systems.

C.2 Work Directives

C.2.1 All work under this contract shall be performed in accordance with the work directives issued by the Contracting Officer. No work shall begin until the Contractor has received a fully executed work directive. Work shall be performed in sequential order as long as completion dates are adhered to.

C.2.2 The contractor may only perform work under this contract to the extent authorized by the discrete, written work directive approved by the Contracting Officer. Work authorized by written work directives shall in no case require or constitute personal services.

C.2.3 The contractor shall not duplicate or otherwise provide effort required to be performed under any of its current or past contracts.

- C.2.4 Each Work Directive shall include at a minimum (see also clause G-4):
- (a) Work Directive number and title
 - (b) Objective of the Work Directive
 - (c) Maximum number of hours authorized
 - (d) Detailed description of discrete tasks to be performed
 - (e) Required completion dates
 - (f) Relative priority of work to be performed
 - (g) Identification of applicable contract number, contractor's name, and address
 - (h) Identification of software to be delivered to TACOM
 - (i) Deliverable CDRL # _____

C.2.5 The Contractor shall notify the Contracting Officer's Technical Representative (COTR) immediately by telephone or E-mail if the dates that the work must be performed or data to be delivered will not be met. The Contractor shall follow up with a letter to the COTR.

C.2.6 The Government has the unilateral right to increase or decrease the work to be performed under this contract by the issuance of work directives signed by the Contracting Officer. It is understood and agreed that such adjustments shall be made within the general scope of work and the level of effort of the contract and without equitable adjustment. The COTR has the right to prioritize work being performed under the contract.

C.2.7 The Contractor shall not exceed costs authorized by the Work Directive. If the Contractor believes the costs incurred during the performance of the work directive exceed the amounts contained in the work directive, the contractor shall provide written notification to the COTR for appropriate action along with a revised cost estimate to complete the work.

C.3 Propulsion Engineering

C.3.1. The Contractor shall provide engineering supplies and services to support both military and commercial ground, water, rail and air propulsion systems and supporting components. Propulsion system and components include, but are not limited to, all types of engines (e.g., diesel, gas turbine, rotary and compound cycles), drive trains (e.g., hydrokinetic, hydromechanical, mechanical, friction drive, electro-mechanical or electric), final drives, air cleaners, cooling systems, intake and exhaust systems, control

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systems, propulsion electrical systems, axles, gearboxes, braking systems, steering systems, auxiliary power units, propeller shafts, couplings (e.g., fluid couplings, universal joints, CV joints, slip joints), differentials, torque converters, fuel cells, batteries, electric motors, generators and electric drive system controls. The propulsion systems and components include both Government and commercial items with output power up to 6,000 horsepower.

- C.3.1.1 The Contractor shall design and redesign in accordance with the guidance provided in the work directive; provide feasibility and trade-off studies.
- C.3.2 The Contractor shall prepare new drawings, or make changes to existing drawings, and submit layout, outline, and installation drawings of the propulsion systems and components identified in paragraph C.3.1 above. The Contractor shall prepare all drawings, either existing or new, required to define the installation, the space claim, the interface points, and assembly, using Computer Aided Design (CAD). The Contractor shall submit deliverables electronically, according to the CDRL schedule.
- C.3.2.1 The Contractor shall deliver two dimensional (2D) drawings in one of three formats, which the CDRL will specify: (i) the International Graphics Exchange Specification (IGES), (ii) Engineering drawings in Continuous Acquisition Lifecycle Support (CALS), Raster Images Type I, Consultative Committee International Telegraph Telephony (CCITT) Group 4, or (iii) AutoCadDXF. The Contractor shall configure the output options, when available, such that no data is lost when TACOM imports digital CAD drawings using its CAD system, (i.e., hardcopy drawings are identical, whether generated at TACOM or the Contractor site). The number of digital drawings used for the acceptance phase shall be representative of the more complex drawings for each type of drawing required.
- C.3.2.2 The contractor shall develop two-dimensional (2D) and three-dimensional (3D) CAD models as required by the work directive. The 3D models are required in one of the following formats: (i) ISO Standard 10303, the Standard for the Exchange of Product (STEP) model data, (ii) the International Graphics Exchange Specification, or (iii) Virtual Reality Modeling Language (VRML) version 2.0. The Contractor shall configure output options, when available, such that no surface data is lost or surface voids exist when CAD models are imported using TACOM's CAD system. The preferred Native format for both 2D drawings and 3D CAD models as a deliverable to TACOM/TARDEC is Pro/E version 20.0.
- C.3.3 To support any engineering, analysis, evaluation, testing, recommendations or management performed under this contract, the Contractor shall fabricate, procure, install, or otherwise provide, on a limited basis, hardware (prototype, developmental, or off-the-shelf), components, kits and assemblies that may be required to support Work Directive activity, product or engineering evaluations, quick field fixes, manufacturing problems, or testing scenarios within the scope of this Contract.
- C.4 Analysis
- C.4.1 The Contractor shall conduct analytic assessments and evaluations, in accordance with the guidance provided in the work directive; provide feasibility and trade-off analyses, perform market research and surveys.
- C.4.2 Analyze fuel consumption, oil consumption, air, fuel and oil filtration systems performance, cooling system performance, total system performance, and mobility performance functions given the actual or proposed end-item parameters. "Mobility Performance Functions" means fulfilling all of the requirements of the end-item performance requirements.
- C.4.3 Conduct analytical and/or experimental investigations or surveys of propulsion components and systems given real or proposed end-item performance requirements.
- C.4.4 Conduct analyses of engine cycles, combustion processes, exhaust emissions shock and vibration and materials technology. If existing computer analysis models are not adequate, the Contractor shall develop appropriate software/analytical tools.
- C.4.5 Conduct technical evaluation of designs, reports, and suggestions.
- C.4.6 Conduct reverse engineering analyses, stress analysis, and computational fluid dynamic analysis.
- C.5 Testing
- C.5.1 The Contractor shall perform structural, mechanical, and performance testing on complete assemblies, subassemblies and components. The Contractor shall perform evaluation and testing to verify performance, environmental, Electro Magnetic Interference (EMI) / Electro Magnetic Compatibility (EMC), reliability, Nuclear Biological Chemical (NBC), interchangeability and maintainability. Capability relationships, external and internal interfaces, flexibility and expansion testing shall be performed. The Contractor shall develop test procedures and plans outlining verification methods which may include test, demonstration, evaluation, assessment, or analysis. If testing is to be conducted at other than the Contractor's facility, the location of the test will be identified in the work directive.
- C.5.2 Conduct dynamometer and end-item tests on components and/or systems. Such tests include the 400-hour NATO, 600-hour mission profile, and other qualification tests that will be run at a specified cyclic test sequence of time, load, speed and power. The Contractor shall develop performance and durability tests of electric drive trains based on prescribed mission profiles similar to

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the 600-hour mission profile test.

C.5.3 Conduct cold start and full load cooling tests on Government and Contractor furnished equipment per the individual end-item performance requirements.

C.5.4 Design, fabricate, and provide experimental propulsion system parts and special test instrumentation.

C.5.5 Develop battery testing, including cycling the batteries for hybrid applications at different temperature settings.

C.5.6 Conduct research and development laboratory tests on propulsion equipment.

C.5.7 Conduct emission testing in conformance with Environmental Protection Agency (EPA) or other regulatory requirements, including any requirements specified in the work directive.

C.6 Evaluation

The Contractor shall evaluate materials (e.g., metals, plastics, and composites) or products (e.g., engine, transmission, electric motors, batteries, power electronics, controllers and components), both domestic and foreign. Reverse engineering of such items may be required, to include drawings and manufacture of replacement hardware items.

C.7 Recommendations

The Contractor shall prepare and make recommendations, records and reports to support any engineering, analysis, evaluation, and/or testing. Documentation augmenting the recommendations, records or reports may be in the form of briefing materials such as viewgraphs, photographs, illustrations, technical data, pamphlets, and brochures. When directed by work directive, the Contractor shall design and provide camera-ready drawings and line art for use in presentations and reports.

C.8 Contract Management

C.8.1 Reports

C.8.1.1 The Contractor shall manage and control the resources necessary to ensure timely achievement of all the requirements of this Contract in the most economical manner to the extent required by this SOW, and any supplemental agreements. The contractor shall submit bi-monthly cost and status reports in accordance with A001.

C.8.1.1.1 Bi-Monthly Contract Progress Status and Management Report, IAW DI-MGMT-80227 (CDRL A001)

C.8.2 Meetings

C.8.2.1 Start-of-Work Meetings. The Contractor shall convene a post-award Start-of-Work meeting within thirty days after award of this basic contract or any work directives issued to establish working relationships and responsibilities, and to review the work directives. The Contractor shall ensure that any major subcontractors attend this meeting.

C.8.2.2 The Contractor shall conduct Management Review Meetings as agreed to with the Contracting Officer's Representative (COR). The purpose of these meetings will be to review cumulative performance of the tasks defined by the SOW. The MR meetings shall be held at a location specified by the Government. Attendance will be limited to key Contractor and Government personnel.

C.8.2.3 The Contractor shall provide administrative support for meetings and Government-scheduled reviews. The Contractor shall provide administrative support to the COR for selected Government briefings and presentations. Administrative support may include the preparation of briefing charts and materials and attendance at Government conferences and meetings. The Contractor shall conduct reviews at the location specified by the COR. Tele/video conferencing support may be required to support meetings. Conference support may include facility, office equipment, and clerical personnel. The Contractor shall attend, take part in, and prepare minutes if requested by the Government work directive. An agenda shall be coordinated between Government and Contractor personnel prior to Contractor-hosted meetings.

C.8.3 Deliverables

C.8.3.1 The Contractor shall prepare all deliverables (e.g., reports and plans) in Contractor format, unless otherwise specified in the work directive, using best in-house practices that will produce documents that are clearly written, describe accomplishments accurately, detail technical issues, and define risks and problems. To facilitate transition to a paperless reporting system, the contractor shall submit reports in electronic format whenever possible. Electronic format shall be compatible to Government computer systems. Acceptable Government format will be identified at the Start of Work meeting initially, and is subject to change as necessary.

C.8.3.2 The Contractor shall furnish the following deliverables to the Government IAW the quantities and according to the schedule

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set forth in Contract Data Requirements List (CDRL) (DD Form 1423), and as specified in the work directive:

- C.8.3.2.1 Project Planning Chart, IAW DI-MGMT-80507A (CDRL A002)
- C.8.3.2.2 Test Plan, IAW DI-NDTI-80566 (CDRL A003)
- C.8.3.2.3 Scientific Technical Report Summary, IAW DI-MISC-80048 (CDRL A004)
- C.8.3.2.4 Scientific and Technical Reports, IAW DI-MISC-80711 (CDRL A005)
- C.8.3.2.5 Technical Report - Study/Services, IAW DI-MGMT-80508 (CRDL A006)
- C.8.3.2.6 Failure Summary and Analysis Report, IAW DI-RELI-80255 (CDRL A007)
- C.8.3.2.7 Informal Technical Information, IAW DI-S-30593 (CDRL A008)
- C.8.3.2.8 Engineering Drawings, IAW DI-DRPR-80651 (CDRL A009)
- C.8.3.2.9 Still Photo Coverage, IAW DI-MISC-80169 (CDRL A010)
- C.8.3.2.10 Technical Videotape Presentation, IAW DI-MISC-81275 (CDRL A011)
- C.8.3.2.11 Presentation Material, IAW DI-A-3024A (CDRL A012)

*** END OF NARRATIVE C 001 ***